New Developments in FM Systems for Infants and Children

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Technology Choices

- Current FM Technology
  - Transmitters
  - Receivers
- Using FM features for pediatric populations
  - Infants and children under 2 years
  - Preschool
  - Elementary School
  - Secondary School
AAA HAT Guideline
5-Step Implementation Process

Step 1: Potential Candidacy for HAT
- Hearing Loss
- Auditory Processing Deficit
- Learning Disability
- Auditory Neuropathy/Dys-synchrony
- Language Deficit
- Attention Deficit
- English Language Learner

Documented evidence of hearing, listening, or learning problems?

No

Yes

Step 2: Considerations [In and out of school]
- Acoustic environment
- Social/emotional
- Functional
- Support

Reconsider

Counsel Monitor Review

Contra-Indication

Yes

No

Step 3: Device Selection

Step 4: Fitting and Verification

Step 5: Implementation and Validation

http://www.audiology.org/resources/documentlibrary/Pages/HearingAssistanceTechnologies.aspx
General Device Considerations

- Ease of accessing FM program
  - Auto (EasyFM) / Manual / Start-up
- Access to battery and ON/OFF with FM attached
- Wear and tear with FM attached
  - How often does FM receiver get removed or replaced
- Overall size with FM attached
- Balance of primary talker (FM) to other talkers (HA)
Transmitter Technology

- Dynamic FM
  - Adaptive FM level
  - Noise processing
- FM Monitoring
  - Receiver Check
  - Sound Check of FM microphone
  - Datalogging
- Multi-Talker Networks
- Voice Activity Detection
Dynamic FM

- Adaptive FM Advantage
  - FM level increases with increasing background noise level up to max of +15 dB FM Level over hearing aid microphone level
  - FM level begins to change when noise level exceeds 57 dB
  - Beginning FM level is still programmable
Transmitter / Receiver Datalogging

- Transmitter Usage Time
- Noise Levels @ Transmitter
- Input Usage
  - iLapel / iBoom / Auxiliary input
- Records monitoring activities
Monitoring Transmitter Usage
The images display two charts showing noise levels over different time periods.

### Chart 1
- Dates: 10/6/2010 to 10/12/2010
- Grid indicating noise levels:
  - Light blue for low ambient noise (< 65 dBSPL)
  - Dark blue for high ambient noise (> 65 dBSPL)
- Days: 10/6/2010 to 10/12/2010

### Chart 2
- Grid indicating noise levels:
  - Light blue for low ambient noise (< 65 dBSPL)
  - Dark blue for high ambient noise (> 65 dBSPL)
Multi-Talker Networks

- Allows team teaching transmission
  - Inspiro to Inspiro
  - DynaMic to Inspiro
- Primary teacher/talker is maintained
- Requires coordination of talkers and activities
FM microphone directionality

- iLapal microphone option has directional features
- Switchable directionality – SmartLink+ / Zoomlink+ / Amigo
Universal FM Receivers

- Switchable between DAI-compatible HA models and manufacturers and CI
- Programmable / Adjustable FM Level
Dedicated FM Receivers

- Semi-integrated into BTE case via battery door
- Smaller overall size when attached to BTE
- Programmable / Adjustable FM Level
- Usually Family-owned system

Combined HA+FM (R12)
Gain/Output characteristics of system are determined by hearing instrument settings.

Hearing instrument has been set for appropriate output and audibility with a variety of speech inputs.

Hearing instrument adjustments are coordinated between dispensing audiologist and educational audiologist.
Other FM Receiver Interfaces

- MyLink+
- Arc
- iCom
- iSense
- Dynamic SF
General Candidacy Considerations

- **Acoustical Environment**
  - Noise / Distance / Reverberation

- **Social / Emotional Factors**
  - Family Support / Classroom Culture / Motivation / Self-Advocacy

- **Functional Factors**
  - Age / Communication Skills / Communication Environment

- **Support Factors**
  - Financial / Monitoring & Managing Equipment
Dispensing audiologist keeps educational audiologist informed when new hearing aids are fit
  ◦ Appropriate battery doors & DAI shoes available

Hearing aids may need programming to access FM input – who is responsible?

Decisions about EasyFM / autoFM access are decided as a team

School provides FM equipment for Dispensing Audiologist to verify FM OR Educational Audiologist verifies FM
School / Clinical Collaboration

- Who provides teacher training and on-going monitoring?
- What happens if the hearing aids are not set appropriately for child and FM?
- What happens if the child’s personal hearing aids are not functioning?
FM Priorities for children under 2 years

- Monitoring functions
- Datalogging information
- Smallest FM receiver as possible
- Loss prevention
- EasyFM or AutoFM reduces switches needed
- Dedicated FM receiver with inspiro transmitter
- Training on appropriate environments for use
FM Priorities for Preschool Age

- Monitoring functions
- Datalogging information
- Loss prevention
- EasyFM or AutoFM reduces switches needed
- School & Home use will determine best type of FM receiver combination
- Team Teaching microphones must be considered carefully
- Consider manually syncing in different preschool learning modules / stations
Urban School Settings

- Dedicated Educational Audiology support
- High numbers of hearing impaired students in school system
  - FM system must be available even when child does not have functional personal hearing aids
  - Education district may choose to provide the entire Amplification System
    - Stock of hearing aids, universal FM receivers and FM transmitters which are all the same
1 or 2 students with hearing-impairment in school system

FM system depends on child having personal hearing aids that function

Rural school settings typically need limited number of FM systems that stay with the same student over several grades

Limited or no Educational Audiology support
  ◦ Dispensing audiologist may take role of educational audiology consultant
  ◦ No one in child’s school building has any familiarity with FM system monitoring / function
FM Priorities for Primary Grades

- Monitoring functions are more critical in lower primary grades
- Consider needs for Multi-talkers versus Level-based instruction
- Adaptability with classroom soundfield systems, Smartboards
FM Priorities Beyond Primary Grades

- Steps to maintain best chance of FM use into secondary grades
  - Evaluate classes where FM most needed
  - Minimal visibility of FM receiver itself
  - Minimal disruption of class flow (transportation of FM mic and ease of function)
- Ease of switching teachers & rooms makes ZoomLink+/EasyLink+ or other lavalier transmitter-mic preferable
- iCom with MLxi or MyLink+
Secondary Grades and Beyond!

- Transition planning begins ahead of time
- Consider iCom/FM receiver combination for a flexible combination to assist college students
  - Bilateral FM input with 1 FM receiver
  - Bluetooth for cell phone & iPod
  - Direct inputs for other devices
- ZoomLink+ for increased flexibility of use in and out of traditional lecture situations
Secondary Grades and Beyond!

The New Interactive Guide to Access Planning

Introducing GAP

Sponsored by Phonak, the interactive GAP Learning Guide was developed to help teens and young adults with hearing loss to better integrate and empower themselves as they make decisions and life choices. GAP is the first guide of its kind that is interactive and combines the wide spectrum of resource materials used to support self-education for hearing people with hearing impairment.

Importantly, it was developed by a team of audiologists, deaf educators and professionals with hearing loss who understand the everyday challenges and work to develop strategies to address them.

We assume that teens and young adults likely receive a certain level of hearing assistance technology while in high school, but recognize that colleges or the workplace have gaps in providing the necessary support. The section called “GAP508” provides teens and young adults with information about their rights as a person with hearing loss, available technology and how to ensure what’s needed for their individual lifestyle needs. It also includes tips and strategies on how to effectively communicate their needs to teachers, employers, etc.

GAP also contains information specifically for professionals such as teachers, college disability coordinators, vocational rehabilitation counselors, and employers who support teens and young adults. Additionally, it provides useful information for parents and caregivers.